



Statement of Basis

Title V Air Quality Permit

**North Western Energy
Redfield, South Dakota**

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1.0 Background

Northwestern Public Service Company was issued a Title V air quality operating permit on March 26, 1996, to operate a peaking electrical generation station in Redfield, South Dakota. The three diesel engine generators are fired with natural gas and distillate oil.

Northwestern Public Service Company submitted an application to renew the Title V air quality operating permit for the Redfield facility on April 24, 2009. The existing permit will expire on November 18, 2009. Since the permit renewal application was submitted in a timely manner, Northwestern Public Service Company is allowed to operate under the existing permit until the department makes its final permit recommendation.

The primary Source Industrial Code (SIC) listed on the application for this facility is 4911 - establishments engaged in the generation, transmission, and/or distribution of electric energy for sale. NorthWestern's Redfield plant provides peak electrical generation. The facility is on call to operate, as needed, the diesel generators. The generators operate with distillate fuel as the fuel source.

2.0 Operational Description

The following is list of equipment derived from the application:

The following is a list of equipment and process that will be reviewed for the renewal application:

- Unit #1** 1962 Fairbanks-Morse diesel engine-generator, model 33DD 8 1/8 / 9700093. The engine is operated on natural gas and distillate oil. The engine-generator has a maximum design operating rate of 13.3 MMBtus per hour heat input. The engine is not equipped with pollution control equipment to reduce air emissions.
- Unit #2** 1962 Fairbanks-Morse diesel engine-generator, model 33DD 8 1/8 / 970014. The engine is operated on natural gas and distillate oil. The engine-generator has a maximum design operating rate of 13.3 MMBtus per hour heat input. The engine is not equipped with pollution control equipment to reduce air emissions.
- Unit #3** 1962 Fairbanks-Morse diesel engine-generator, model 33DD 8 1/8 / 970090. The engine is operated on natural gas and distillate oil. The engine-generator has a maximum design operating rate of 13.3 MMBtus per hour heat input. The engine is not equipped with pollution control equipment to reduce air emissions.
- Unit #4** Tank #1 – 10,000 gallon above ground storage tank constructed in 1968 and used to store distillate fuel.

2.1 Insignificant Activities

The following units were determined to be insignificant activities or exempt units during previous reviews and do not require coverage under the permit:

- Three Modine heaters. Each heater has a maximum heat input capacity of 240,000 Btus per hour. In accordance with ARSD 74:36:05:04.01(4), a device or apparatus with a heat input capability of not more than 3,500,000 Btus per hour is considered an insignificant activity.
- Three day tanks located in the basement of the facility.

3.0 Applicable Requirements

3.1 New Source Performance Standards

The department reviewed the New Source Performance Standards (NSPS) and determined that several NSPS need to be reviewed further to determine if they are applicable.

3.1.1 ARSD 74:36:07:88 – 40 CFR, Part 60, Subpart IIII

The department reviewed 40 CFR Part 60, Subpart IIII for applicability. Subpart IIII is applicable to owners and operators of stationary compression ignition (CI) internal combustion engines (ICE) that:

- Commence construction after July 11, 2005 where the stationary CI ICE are manufactured after April 1, 2006 and are not fire pump engines; or
- Modify or reconstruct their stationary CI ICE after July 11, 2005.

In accordance with 40 CFR §60.4219, a compression ignition means a type of stationary internal combustion engine that is not a spark ignition engine - an engine that combusts gasoline, natural gas or liquefied petroleum. Northwestern Energy's generator is considered a compression ignition engine because its fuel source is diesel fuel.

Northwestern's generators were constructed in 1962; therefore, Subpart IIII is not applicable.

3.1.1 ARSD 74:36:07:?? – 40 CFR, Part 60, Subpart JJJJ

The department reviewed 40 CFR Part 60, Subpart JJJJ for applicability. Subpart JJJJ is applicable to owners and operators of stationary spark ignition (SI) internal combustion engines (ICE) that:

Owners and operators of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured:

On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 HP (except lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP);

The maximum rated horsepower for the generators is 1,823 Hp. However, the date of construction of the generators is 1962-therefore, Subpart JJJJ is not applicable.

3.1.2 ARSD 74:36:07:12 – 40 CFR, Part 60, Subpart K

The department determined that 40 CFR Part 60, Subpart K may be applicable.

Subpart K – Standards of Performance for storage vessels of petroleum liquids constructed after June 11, 1973, and before May 19, 1978, is applicable to owners and operators of volatile organic liquid storage vessels that:

- Construction, reconstruction, or modification commenced after June 11, 1973 and before May 19, 1978; and
- The tank has a capacity greater than or equal to 151,412 liters (40,000 gallons) that is used to store volatile organic liquids.

The storage capacity of the distillate fuel storage tank is 10,000 gallons (37,854 liters), which is less than 151,412 liters. Northwestern Energy is storing distillate oil in the tank, which has a maximum true vapor pressure of 0.0048 pounds per square inch absolute (0.04 kilopascals), the tank is not subject to the standards for volatile organic compounds. Although the date of construction of the tank is unknown, NorthWestern Energy states in the application that it was constructed in 1968. Therefore, this subpart is not applicable to the storage tanks.

3.1.3 ARSD 74:36:07:13 – 40 CFR, Part 60, Subpart Ka

The department determined that 40 CFR Part 60, Subpart Ka may be applicable.

Subpart Ka – Standards of Performance for storage vessels of petroleum liquids constructed after May 18, 1978 and before July 24, 1984, is applicable to owners and operators of volatile liquid storage vessels that:

- Construction, reconstruction, or modification commenced after May 18, 1978 and before July 24, 1984; and
- The tank has a capacity greater than or equal to 151,416 liters (40,000 gallons) that is used to store volatile organic liquids.

The storage capacity of the distillate fuel storage tank is 10,000 gallons (37,854 liters), which is less than 151,416 liters. Northwestern Energy is storing distillate oil in the tank, which has a maximum true vapor pressure of 0.0048 pounds per square inch absolute (0.04 kilopascals) therefore, the tank is not subject to the standards for volatile organic compounds. Although the date of construction of the tank is unknown, NorthWestern Energy states in the application that it was constructed in 1968. Therefore, this subpart is not applicable to the storage tanks.

3.1.4 ARSD 74:36:07:14 – 40 CFR, Part 60, Subpart Kb

The department determined that 40 CFR Part 60, Subpart Kb may be applicable.

Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction, or Modification Commenced after July 23, 1984, is applicable to owners and operators of volatile liquid storage vessels that:

- Has a capacity greater than or equal to 75 cubic meters and used to store volatile organic liquids; and
- Commenced construction, reconstruction, or modification after July 23, 1984.

The storage capacity of the distillate fuel storage tank is 10,000 gallons (37.9 cubic meters), which is less than 75 cubic meters. The tanks are used to store distillate oil, which has a maximum true vapor pressure of 0.0048 pounds per square inch absolute (0.04 kilopascals) which does not meet the standards for volatile organic compounds. Although the date of construction of the tank is unknown, NorthWestern Energy states in the application that it was constructed in 1968. Therefore, this subpart is not applicable to the storage tanks.

3.2 New Source Review

ARSD 74:36:10:01 states that New Source Review (NSR) regulations apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. NorthWestern Energy's facility is located in Faulkton, South Dakota, which is in attainment or unclassifiable for all the pollutants regulated under the Clean Air Act. Therefore, NorthWestern Energy is not subject to NSR review.

3.3 Prevention of Significant Deterioration

Any stationary source which emits, or has the potential to emit, 250 tons per year or more of any regulated NSR air pollutant is considered a major source and subject to prevention of significant deterioration (PSD) requirements under ARSD 74:36:09 – 40 CFR §52.21(b)(1). Any stationary source which emits or has the potential to emit 100 tons per year or more of any regulated NSR air pollutant and is subject to one of the 28 named PSD source categories is subject to PSD requirements in ARSD 74:36:09 – 40 CFR §52.21(b)(1).

3.3.1 Emission Factors

3.3.1-1 Tanks

The emissions factors for the tank are derived from computer software program Tanks 4.0.9

3.3.2 Potential Emission Calculations

Potential emissions for each applicable pollutant are calculated from the maximum design capacity listed in the application and assuming the unit operates every hour of every day of the year. Northwestern Energy does not have control equipment associated with the diesel engine - generator; therefore, the potential uncontrolled and controlled emissions are the same.

The calculations for the potential emissions for the Tanks are in Appendix B. Table #1 provides a summary of the potential emissions

Equation 3.1, the maximum designed operating rate in kilowatts, an efficiency of 35%, and a conversion factor of 3,413 Btus per kilowatt-hour were used to calculate the maximum designed operating rate based on heat input of the generator in million Btus (MMBtus) per hour.

Equation 3.1 – Heat Input Calculation

$$HeatInput \left[\frac{MMBtus}{hr} \right] = \left(\frac{OperatingRate [kW] \times 3,413 \left[\frac{Btu}{hr \times kW} \right]}{10^6 \left[\frac{Btu}{MMBtu} \right] \times 35\%} \right)$$

The maximum designed heat input for the generators is 13.3 MMBtu per hour. The potential emissions for the generator were calculated using Equation 3.2.

DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) and Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017) documents, the applicant's application, or other methods to determine potential air emissions.

Uncontrolled emission factors for the generators fueled with distillate oil were derived from AP-42, Tables 3.4-1 through 3.4-3 (10/96). The emission factors for the generators are summarized in Table 3.3.

3.3.3 Emission Factors

The maximum generating capacity of the diesel engine is 1,360 kilowatts (approximately 1,820 horsepower). A generator with a capacity greater than 600 horsepower is defined as a large diesel generator. The diesel engine – generator is defined as a large diesel generator because its maximum generating capacity is greater than 600 horsepower.

The emission factors are derived from AP-42 Tables 3.4-1, 3.4-3, and 3.4-4 (10/96) for Large Stationary Diesel and All Stationary Dual-fuel Engines. The sulfur dioxide emission rate is based on sulfur content in the distillate oil of 0.28 weight percent.

The emissions factors for the tanks are derived from computer software program Tanks 4.09.

Table 3.3-1 Emission Factors for Diesel Generators

	Pollutant (lbs/MMBtu)	TSP	PM10	¹ SO ₂	NO _x	VOC	CO	HAPs
Diesel		0.0697	0.0573	0.28	3.2	0.082	0.85	0.00435

$$\begin{aligned}
 {}^1\text{SO}_2 &= 1.01 \times S_1 \text{ pounds per MMBtu; where } S_1 = \text{weight percent sulfur in distillate oil} \\
 &= 1.01 \times 0.28 \text{ pounds per MMBtu} \\
 &= 0.28 \text{ pounds per MMBtu}
 \end{aligned}$$

3.3.4 Potential Emission Calculations

Potential emissions for each applicable pollutant are calculated from the maximum design capacity listed in the application and assuming the unit operates every hour of every day of the year. Northwestern Energy does not have control equipment associated with the diesel engine - generator; therefore, the potential uncontrolled and controlled emissions are the same.

The calculations for the potential emissions for the Tanks are in Appendix B. Table #3-2 provides a summary of the potential emissions

Equation 3.1, the maximum designed operating rate in kilowatts, an efficiency of 35%, and a conversion factor of 3,413 Btus per kilowatt-hour were used to calculate the maximum designed operating rate based on heat input of the generator in million Btus (MMBtus) per hour.

Equation 3.1 – Heat Input Calculation

$$\text{HeatInput} \left[\frac{\text{MMBtus}}{\text{hr}} \right] = \left(\frac{\text{OperatingRate} \left[\text{W} \right] \times 3,413 \left[\frac{\text{Btu}}{\text{hr} \times \text{kW}} \right]}{10^6 \left[\frac{\text{Btu}}{\text{MMBtu}} \right] \times 35\%} \right)$$

The maximum designed heat input for the generator is 13.3 MMBtu per hour. The potential emissions for the generator were calculated using Equation 3.2.

Equation 3.2 – Potential Emission Calculations for Distillate Oil

$$\text{PotentialEmissions} \left[\frac{\text{tons}}{\text{year}} \right] = \left(\frac{\text{EmissionFactor} \left[\frac{\text{pounds}}{\text{MMBTU}} \right] \times \text{AnnualOperations} \left[\frac{\text{hr}}{\text{year}} \right] \times \text{HeatInput} \left[\frac{\text{MMBtu}}{\text{hr}} \right]}{2000 \left[\frac{\text{pounds}}{\text{tons}} \right]} \right)$$

Annual potential emissions for each applicable pollutant are calculated from the maximum design capacity listed in the application, assuming the unit operates every hour of every day of the year or 8,760 hours per year, and the AP-42 emission factors from Section 3.3.1-1.

Table #3-2
Potential Emissions – Diesel Fuel

Description	TSP	PM10	SO ₂	NO _x	VOC	HAPs	CO
	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)
Generator #1	4.1	3.3	16.3	186.4	4.8	0.3	49.5
Generator #2	4.1	3.3	16.3	186.4	4.8	0.3	49.5
Generator #3	4.1	3.3	16.3	186.4	4.8	0.3	49.5
Tank #1	-	-	-	-	0.0	-	-
Total Emissions	12.3	9.9	49.0	559.2	14.4	0.9	148.5

The HAP total does not need to be broken down into individual HAP components because the total HAPs were less than the individual threshold limit of 10 tons per year.

3.3.3 PSD Applicability

Any stationary source which constructed or modified after August 7, 1977 and emits or has the potential to emit 250 tons per year or more of any air pollutant is subject to Prevention of Significant Deterioration (PSD) requirements (*ARSD 74:36:09 – 40 C.F.R. Part 52.21(b)(1)*). Any stationary source which emits, or has the potential to emit, 100 tons per year or more of any air pollutant and is subject to one of the 28 named PSD source categories is subject to PSD requirements (*ARSD 74:36:09 – 40 C.F.R. Part 52.21(b)(1)*).

Northwestern Energy is not one of the 28 named PSD source categories but does have the potential nitrogen oxide emissions greater than 250 tons per year threshold. Therefore, Northwestern Energy is considered a major source under the PSD program. Since Northwestern Energy was constructed in 1962, which is prior to August 7, 1977, Northwestern Energy has not been required to obtain a PSD permit. However, any modification that occurs at this facility must be reviewed to determine if it is considered a major modification under the PSD program.

3.4 National Emissions Standards for Hazardous Air Pollutants

The department reviewed the Maximum Achievable Control Technology (MACT) standards and determined that one MACT standard needs to be reviewed further to determine if it is applicable.

3.4.1 40 CFR, Part 63, Subpart ZZZZ

40 CFR Part 63, Subpart ZZZZ is subject to owners or operators of a stationary Reciprocating Combustion Engine (RICE) at a major and area source of HAP emissions. Stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. A major source of HAP emissions is a plant site that emits or has the potential to emit any single HAP at a rate of 10 tons or more per year or any combination of HAP at a rate of 25 tons or more per year.

NorthWestern Energy is not a major source of HAP; however NorthWestern Energy is an area source of HAP. As noted in 40 CFR §63.6590(a)(2)(iii) a new stationary RICE is a stationary RICE located at an area source of HAP emissions is new if construction of the stationary RICE began on or after June 12, 2006.

NorthWestern Energy's generator was installed in 1962; therefore, this subpart is not applicable.

3.5 State Requirements

3.5.1 State Emission Limits

Total suspended particulate and sulfur dioxide emission limits are applicable to fuel burning units. NorthWestern Energy's operations involve fuel burning units. The total suspended particulate and sulfur dioxide emission limits for fuel burning units are derived from ARSD 74:36:06:02.

Tables #2 and #3 compare the potential emission rates to the allowable emission limits for particulate and sulfur dioxide, respectively.

**Table #2
Particulate (TSP) Comparison**

Unit	Distillate Oil Potential Rate	Particulate Limit
Diesel Generators	0.0697 lbs/MMBtu	0.578 lbs/MMBtu

**Table #3
Sulfur Dioxide Comparison**

Unit	Distillate Oil Potential Rate	Sulfur Dioxide Limit
Diesel Generators	0.28 lbs/MMBtus	3 lbs/MMBtu

3.5.2 State Restrictions on Visible Emissions

Visible emissions are applicable to any unit that discharges to the ambient air. In accordance with ARSD 74:36:12, a facility may not discharge into the ambient air more than 20 percent

opacity for all units. NorthWestern Energy must control the opacity at less than 20 percent for the generator.

3.5.3 Insignificant Activities

In accordance with ARSD 74:36:05:04.01(7), any unit that has the potential to emit two tons or less per year of any criteria pollutant before the application of control equipment is considered an insignificant activity and is exempt from inclusion in the Title V air quality operating permit. Tank #1 is considered to be an insignificant activity.

3.5.4 Air Fees

Title V sources are subject to an annual air quality fee. The fee consists of an administrative fee and a per ton fee based on the actual tons per year of pollutant emitted. The pollutants that are charged are particulate matter, sulfur dioxides, nitrogen oxides, volatile organic compounds and hazardous air pollutants. Presently, the air emission fee is \$6.10 per ton of pollutant actually emitted. The actual emissions are calculated by the department and are based on information provided by the source.

Northwestern Energy will be required to operate within the requirements stipulated in the following regulations:

3.6 Title V Air Quality Permit

Any source operating in South Dakota that meets the definition of ARSD 74:36:05:03 is required to obtain a Title V air quality permit. A Title V air quality permit is required if a source has the potential to emit more than 100 tons of a criteria pollutant (nitrogen oxide, volatile organic compounds, PM10, carbon monoxide, lead and ozone), has the potential to emit more than 10 tons of a single hazardous air pollutant, has the potential to emit more than 25 tons of any combination of a hazardous air pollutants, or is applicable to a New Source Performance Standard or a MACT standard.

NorthWestern Energy's diesel generator has the potential to emit more than 250 tons of any one pollutant, i.e. NOx. The potential emissions from the tank is less than 0.1 tons per year. In accordance with ARSD 74:36:05:04:01, a unit with the potential to emit less than two tons or less per year before considering controls is exempt from being included in a Title V air quality permit and are considered insignificant activities. Table 3.6 summarizes the permitted unit (s).

Table 3.6 Description of Permitted Units, Operations, and Processes

Identification	Description	Maximum Operating Rate	Control Device
Unit #1	1962 Fairbanks – Morse	1,360 kilowatts heat output or	Not applicable

	diesel engine - generator, model number 33DD8 1/8 970093. The generator is fired on distillate oil and natural gas.	13.3 million Btus per hour heat input	
Unit #2	1962 Fairbanks – Morse diesel engine - generator, model number 33DD8 1/8 970014. The generator is fired on distillate oil and natural gas.	1,360 kilowatts heat output or 13.3 million Btus per hour heat input	Not applicable
Unit #3	1962 Fairbanks – Morse diesel engine - generator, model number 33DD8 1/8 970090. The generator is fired on distillate oil and natural gas.	1,360 kilowatts heat output or 13.3 million Btus per hour heat input	Not applicable

3.6.1 Compliance Assurance Monitoring (CAM)

Compliance assurance monitoring is applicable to permit applications received on or after April 20, 1998, from major sources applying for a Title V permit. Northwestern Energy's renewal application was received on March 1, 2001. Therefore, compliance assurance monitoring is applicable to any unit that meets the following criteria:

1. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;
2. The unit uses a control device to achieve compliance with any such emission limit or standard; and
3. The unit has potential uncontrolled emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

Northwestern Energy does not use a control device to achieve compliance with applicable requirements. Therefore, compliance assurance monitoring is not applicable to Northwestern Energy.

3.6.2 Periodic Monitoring

Periodic monitoring is required for each emission unit that is subject to an applicable requirement at a source subject to Title V of the federal Clean Air Act. Northwestern Energy is required to meet opacity, particulate and sulfur dioxide emission limits.

Periodic monitoring for the opacity and particulate emission limits may consist of visible emission readings, stack tests, pressure drop readings for the appropriate control device,

implementation of a maintenance plan for the appropriate control device, etc. Northwestern Energy typically operates the diesel engine – generator less than 100 hours in a calendar year. Therefore, stack testing is not considered economical. Northwestern Energy will be required to perform periodic visible emission readings when the unit is in operation to ensure the unit can meet its opacity and particulate emission limits. The permit contains sufficient language which allows the department to require Northwestern Energy to conduct a stack test if visible emission readings or hours of operation warrant a stack test during the term of the permit.

Periodic monitoring for sulfur dioxide shall be based on the sulfur content of the distillate oil fired in the engine – generator.

3.7 Summary of Applicable Requirements

ARSD 74:36:05 - Operating Permits for Part 70 Sources;
ARSD 74:36:06 - Regulated Air Pollutant Emissions;
ARSD 74:36:11 - Performance Testing;
ARSD 74:36:12 - Control of Visible Emissions; and
ARSD 74:37:01 - Air Pollution Control Program Fees.

4.0 Recommendation

Based on the information submitted in the air quality permit application, the department recommends approval of a Title V air quality permit for NorthWestern facility in Faulkton, South Dakota. Questions regarding this permit review should be directed to Keith Gestring, Natural Resources Project Engineer, Air Quality Program.

Appendix A

Potential Emission Limit Calculations

Northwestern Public Service -- Clark

Diesel Engine -- Generator #1 (1962)

Given information	Emission Factor (lbs/MMBtu)	Emission Calculations	
		Formula	Annual Emissions (tons/year)
Heat Capacity	TSP 0.0697	$(\text{Heat Capacity}) \times (\text{Emission Factor}) \times (\text{Potential Operating}) / (2000 \text{ lb/ton})$	4.1
13.3 MMBtu/hour	PM10 0.0573	$(\text{Heat Capacity}) \times (\text{Emission Factor}) \times (\text{Potential Operating}) / (2000 \text{ lb/ton})$	3.3
	SO ₂ 0.28	$(\text{Heat Capacity}) \times (\text{Emission Factor}) \times (\text{Potential Operating}) / (2000 \text{ lb/ton})$	16.3
Potential Operating	NO _x 2.7	$(\text{Heat Capacity}) \times (\text{Emission Factor}) \times (\text{Potential Operating}) / (2000 \text{ lb/ton})$	157.3
8760 hours/year	VOC 0.082	$(\text{Heat Capacity}) \times (\text{Emission Factor}) \times (\text{Potential Operating}) / (2000 \text{ lb/ton})$	4.8
	HAP 0.00156	$(\text{Heat Capacity}) \times (\text{Emission Factor}) \times (\text{Potential Operating}) / (2000 \text{ lb/ton})$	0.1
	CO 0.85	$(\text{Heat Capacity}) \times (\text{Emission Factor}) \times (\text{Potential Operating}) / (2000 \text{ lb/ton})$	49.5
The heat input for Diesel Engine Generator is based on the Maximum design operating rate of 2750 kilowatts and an estimated operating efficiency of 35%.			
1360 kilowatts	13.3 MMBtu/hour	$(2750 \text{ kilowatts}) \times (3413 \text{ Btu / hour - kilowatts}) / (1000000 \text{ Btus/MMBtu}) / (0.35\%)$	

Northwestern Public Service -- Clark						
Diesel Engine -- Generator #2 (1962)						
Given information		Emission Factor (lbs/MMBtu)		Emission Calculations		Annual Emissions (tons/year)
				Formula		
Heat Capacity		TSP	0.0697	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		4.1
13.3	MMBtu/hour	PM10	0.0573	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		3.3
		SO ₂	0.28	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		16.3
Potential Operating		NO _x	2.7	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		157.3
8760	hours/year	VOC	0.082	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		4.8
		HAP	0.00156	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		0.1
		CO	0.85	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		49.5
The heat input for Diesel Engine Generator is based on the Maximum design operating rate of 2750 kilowatts and an estimated operating efficiency of 35%.						
1360	kilowatts	13.3	MMBtu/hour	(2750 kilowatts) x (3413 Btu / hour - kilowatts) / (1000000 Btus/MMBtu) / (0.35%)		

Northwestern Public Service -- Clark						
Diesel Engine -- Generator #3 (1962)						
Given information		Emission Factor (lbs/MMBtu)		Emission Calculations		Annual Emissions (tons/year)
				Formula		
Heat Capacity		TSP	0.0697	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		4.1
13.3	MMBtu/hour	PM10	0.0573	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		3.3
		SO ₂	0.28	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		16.3
Potential Operating		NO _x	2.7	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		157.3
8760	hours/year	VOC	0.082	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		4.8
		HAP	0.00156	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		0.1
		CO	0.85	(Heat Capacity) x (Emission Factor) x (Potential Operating) / (2000 lb/ton)		49.5
The heat input for Diesel Engine Generator is based on the Maximum design operating rate of 2750 kilowatts and an estimated operating efficiency of 35%.						
1360	kilowatts	13.3	MMBtu/hour	(2750 kilowatts) x (3413 Btu / hour - kilowatts) / (1000000 Btus/MMBtu) / (0.35%)		

Appendix B

TANKS 4.09 Emission Calculations

TANKS 4.0.9d

Emissions Report - Summary Format

Tank Identification and Physical Characteristics

Identification

User Identification: NorthWestern Energy - Tank #1
 City: Redfield
 State: South Dakota
 Company: NorthWestern
 Type of Tank: Vertical Fixed Roof Tank
 Description: Redfield facility

Tank Dimensions

Shell Height (ft): 12.00
 Diameter (ft): 12.00
 Liquid Height (ft) : 11.60
 Avg. Liquid Height (ft): 10.00
 Volume (gallons): 10,152.36
 Turnovers: 1.00
 Net Throughput(gal/yr): 10,152.36
 Is Tank Heated (y/n): N

Paint Characteristics

Shell Color/Shade: White/White
 Shell Condition: Good
 Roof Color/Shade: White/White
 Roof Condition: Good

Roof Characteristics

Type: Dome
 Height (ft): 0.00
 Radius (ft) (Dome Roof): 0.00

Breather Vent Settings

Vacuum Settings (psig): -0.03
 Pressure Settings (psig): 0.03

Meteorological Data used in Emissions Calculations: Aberdeen, South Dakota (Avg Atmospheric Pressure = 14.05 psia)

TANKS 4.0.9d

Emissions Report - Summary Format

Liquid Contents of Storage Tank

NorthWestern Energy - Tank #1 - Vertical Fixed Roof Tank
Redfield, South Dakota

Daily Liquid Surf.	Liquid	Vapor Pressure (psia)	Vapor	Liquid	Vapor	Mol.	Basis for Vapor Pressure
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Mixture/Component	Month	Temperature (deg F)			Bulk Temp (deg F)				Mol.	Mass	Mass	Weight	Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.	Weight.	Fract.	Fract.		
Distillate fuel oil no. 2	All	45.17	39.39	50.96	43.45	0.0038	0.0031	0.0047	130.0000			188.00	Option 1: VP40 = .0031 VP50 = .0045

TANKS 4.0.9d
Emissions Report - Summary Format
Individual Tank Emission Totals

Emissions Report for: Annual

NorthWestern Energy - Tank #1 - Vertical Fixed Roof Tank
Redfield, South Dakota

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.12	0.45	0.57

Appendix C

Revised Permit Conditions

1.1 Operation of source. In accordance with Administrative Rules of South Dakota (ARSD) 74:36:05:16.01(8), the owner or operator shall operate the units, controls, and processes as described in Table #1 in accordance with the statements, representations, and supporting data contained in the complete permit application submitted April 24, 2009, unless modified by the conditions of this permit. The application consists of the application forms, supporting data, and supplementary correspondence. If the owner or operator becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in an application, such information shall be promptly submitted.

1.8 Credible evidence. In accordance with ARSD 74:36:13:07, credible evidence may be used for the purpose of establishing whether the owner or operator has violated or is violation of this permit. Credible evidence is as follows:

1. Information from the use of the following methods is presumptively credible evidence of whether a violation has occurred at the source:
 - a. A monitoring method approved for the source pursuant to 40 CFR § 70.6(a)(3) and incorporated in this permit; or
 - b. Compliance methods specified in an applicable plan;
2. The following testing, monitoring, or information gathering methods are presumptively credible testing, monitoring, or information-gathering methods:
 - a. Any monitoring or testing methods approved in this permit, including those in 40 CFR Parts 51, 60, 61, and 75; or
 - b. Other testing, monitoring, or information-gathering methods that produce information comparable to that produced by any method in section (1) or (2)(a).

3.4 Permit modification. In accordance with ARSD 74:36:05:39, an owner or operator may apply for a permit modification. A permit modification is defined in ARSD 74:36:01:10 as a physical change in or change in the operations of a source that results in at least one of the following: ~~any proposed change that is not an administrative amendment or a minor permit amendment.~~

-Does not violate any applicable requirements;

1. Does not involve significant changes to existing monitoring, reporting, or record keeping requirements;
2. Does not require or change a case-by-case determination of an emission limit or other standard, a source-specific determination for temporary sources of ambient impacts, or a visibility or increment analysis; or
3. Does not seek to establish or change a permit term or condition for which the source has assumed to avoid an applicable requirement, a federally enforceable emission cap, or an alternative emission limit. An alternative emission limit is approved pursuant to regulations promulgated under section 112(i)(5) of the federal Clean Air Act.

5.4 Monitoring log. In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall maintain a monitoring log. The monitoring log shall contain the following information.

1. Maintenance schedule for each piece of control equipment listed in Table 1. At a minimum, the maintenance schedule shall meet the manufacturer's recommended schedule for maintenance. The following information shall be recorded for maintenance:
 - a. Identify the unit;
 - b. The date and time maintenance was performed;
 - c. Description of the type of maintenance;
 - d. Reason for performing maintenance;
 - e. Signature of person performing maintenance;
2. The following information shall be recorded for each visible emission reading required in permit condition 8.1:
 - a. Identify the unit;
 - b. The date and time the visible emission reading was performed;
 - c. If visible emissions were observed;
 - d. Description of maintenance performed to eliminate visible emissions;
 - e. Visible emission evaluation if visible emissions are not eliminated; and
 - f. Signature of person performing visible emission reading and/or visible emission evaluation;
3. The owner or operator shall maintain relevant records of the occurrence and duration of each startup, shutdown, or malfunction of process equipment and/or air pollution control equipment; and
4. The following information shall be recorded within two days of each emergency exceedance:
 - a. The date of the emergency exceedance and the date the emergency exceedance was reported to the Secretary;
 - b. The cause(s) of the emergency;
 - c. The reasonable steps taken to minimize the emissions during the emergency; and
 - d. A statement that the permitted equipment was at the time being properly operated.

5.45 Annual records. In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall calculate and record the following amounts from January 1 to December 31 of each year:

1. The amount of distillate oil burned in Unit #1;
2. The sulfur content of the distillate oil that is burned; and
3. The number of hours Units #1 is operated.

The amount distillate oil consumed shall be based on consumption and purchase records. The records will be used in junction with the operational report required in permit condition 2.2.

5.56 Annual compliance certification. In accordance with ARSD 74:36:05:16.01(14), the owner or operator shall submit an annual compliance certification letter to the Secretary by March 1 of each year this permit is in effect (NOTE: The Secretary will forward a copy of the certification letter to EPA). The certification shall contain the following information:

1. Methods used to determine compliance, including: monitoring, record keeping, performance testing and reporting requirements;
2. The source is in compliance and will continue to demonstrate compliance with all applicable requirements;
3. In the event the source is in noncompliance, a compliance plan that indicates how the source has or will be brought into compliance; and
4. Certification statement required in permit condition 5.3.

5.67 Reporting permit violations. In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall report all permit violations. A permit violation should be reported as soon as possible, but no later than the first business day following the day the violation was discovered. The permit violation may be reported by telephone to the South Dakota Department of Environment and Natural Resources at (605) 773-3151 or by FAX at (605) 773-5286.

A written report shall be submitted within five days of discovering the permit violation. Upon prior approval from the Secretary, the submittal deadline for the written report may be extended up to 30 days. The written report shall contain:

1. Description of the permit violation and its cause(s);
2. Duration of the permit violation, including exact dates and times; and
3. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the permit violation.

The Secretary may waive the written report on a case-by-case basis if the oral report has been received within the reporting period and dependent upon the severity of the permit violation.

6.3 Total suspended particulate matter limits. ~~Particulate limits.~~ In accordance with ARSD 74:36:06:02(1), the owner or operator shall not allow the emission of particulate in excess of the emission limit specified in Table ~~#2~~ **6-1** for the appropriate permitted unit, operations, and process:

Table ~~#2~~ 6-1
Total Suspended Particulate Emission Limit

Identification	Description	Emission Limit
Unit #1	1962 Fairbanks – Morse diesel engine-generator	0.6 0.58 pounds per million Btu heat input
Unit #2	1962 Fairbanks – Morse diesel engine-generator	0.6 0.58 pounds per million Btu heat input
Unit #3	1962 Fairbanks – Morse diesel engine-generator	0.6 0.58 pounds per million Btu heat input

6.4 Sulfur dioxide limits. In accordance with ARSD 74:36:06:02(2), the owner or operator shall not allow the emission of sulfur dioxide in excess of the emission limit specified in Table #3 for the appropriate permitted unit, operations, and process:

Table #3 6-2
Sulfur Dioxide Emission Limit

Identification	Description	Emission Limit
Unit #1	1962 Fairbanks – Morse diesel engine - generator	3.0 pounds per million Btu heat input
Unit #2	1962 Fairbanks – Morse diesel engine - generator	3.0 pounds per million Btu heat input
Unit #3	1962 Fairbanks – Morse diesel engine - generator	3.0 pounds per million Btu heat input

Compliance with the sulfur dioxide emission limit is based on a three-hour rolling average, which is the arithmetic average of three contiguous one-hour periods.

6.5 Air emission exceedances – emergency conditions. In accordance with ARSD 74:36:05:16.01(18), the Secretary will allow for an emission exceedance of a technology-based emission limit if the exceedance is caused by an emergency condition and immediate action is taken by the owner or operator to restore the operations back to normal. An emergency condition is a situation arising from a sudden and reasonably unforeseeable event beyond the control of the source, including acts of God. An emergency shall not include an emission exceedance to the extent caused by improperly designed equipment, lack of preventive maintenance, careless or improper operation, or operator error. The owner or operator shall notify the Secretary within two working days of the incident and take all steps possible to eliminate the excess emissions. The notification must provide a description of the emergency, any steps taken to mitigate emissions, and corrective actions taken. If the notification is submitted orally, a written report summarizing the information required by the notification shall be submitted and postmarked within 30 days of the oral notification

7.3 Representative performance test. In accordance with ARSD 74:36:07:01, as referenced to 40 CFR § 60.8(c), performance tests shall be conducted under such conditions as the Secretary shall specify to the owner or operator based on the representative performance of the unit being tested. The owner or operator shall make available to the Secretary such records as may be necessary to determine the conditions of the performance tests. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a performance test nor shall emissions in excess of the level of the applicable emission limit during periods of startup, shutdown, and malfunction be considered a violation of the applicable emission limit unless otherwise specified in this permit.

7.34 Submittal of test plan. In accordance with ARSD 74:36:11:01, the owner or operator shall submit the proposed testing procedures to the Secretary at least 30 days prior to any performance test. The Secretary will notify the owner or operator if the proposed test procedures are approved or denied. If the proposed test procedures are denied, the Secretary will provide written notification that outlines what needs to be completed for approval.

7.45 Notification of test. In accordance with ARSD 74:36:11:03, the owner or operator shall notify the Secretary at least 10 days prior to the start of a performance test to arrange for an agreeable test date when the Secretary may observe the test. The Secretary may extend the deadline for the performance test in order to accommodate schedules in arranging an agreeable test date.

7.56 Performance test report. In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall submit a performance test report to the Secretary within 60 days after completing the performance test or by a date designated by the Secretary. The performance test report shall contain the following information:

1. A brief description of the process and the air pollution control system being tested;
2. Sampling location description(s);
3. A description of sampling and analytical procedures and any modifications to standard procedures;
4. Test results;
5. Quality assurance procedures and results;
6. Records of operating conditions during the test, preparation of standards, and calibration procedures;
7. Raw data sheets for field sampling and field and laboratory analyses;
8. Documentation of calculations;
9. All data recorded and used to establish parameters for compliance monitoring; and
10. Any other information required by the test method.

8.3 Monitoring sulfur content of distillate oil. In accordance with ARSD 74:36:05:16.01(9), the owner or operator shall obtain a fuel supplier certification for each load of distillate oil purchased or received. The fuel supplier certification shall include the following information:

1. The name of the oil supplier;
2. A statement from the oil supplier that the oil complies with the specifications under the definition of distillate oil. Distillate oil means fuel oil that complies with the specifications for fuel oil numbers 1 or 2. Residual oil means crude oil, fuel oil that does not comply with the specifications under the definition of distillate oil, and all fuel oil numbers 4, 5, and 6. Specifications for fuel oils are defined in the American Society for Testing and Materials in ASTM D396-78, "Standards Specifications for Fuel Oils"; and
3. A statement that the sulfur content of the oil does not exceed 0.5 weight percent sulfur.

In the case where a fuel supplier certification is not obtained, the owner or operator shall collect

a grab sample from the distillate oil storage tank within 30 days of receiving the shipment of distillate oil but before another load of distillate oil is transferred into the storage tank. The grab sample shall be analyzed to determine the sulfur content of the distillate oil in the storage tank. A copy of the results of the distillate oil analysis shall be submitted with the semiannual report required in permit condition 5.6.